



Rewarding Learning

General Certificate of Secondary Education  
2014–2015

## Science: Single Award

Unit 2 (Chemistry)

Foundation Tier

[GSS21]



THURSDAY 13 NOVEMBER 2014, MORNING

Centre Number

71

Candidate Number

--

### TIME

1 hour, plus your additional time allowance.

### INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

Write your answers in the spaces provided in this question paper.  
Answer **all ten** questions.

### INFORMATION FOR CANDIDATES

The total mark for this paper is 60.

Quality of written communication will be assessed in Question **10**.  
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.  
A Data Leaflet, which includes a Periodic Table of the Elements, is included in this question paper.

For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

<b>Total Marks</b>	
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- 1 (a) Below there is information about some household substances. Fill in the missing answers in the table below.

Choose from:

vinegar : baking soda : lemon juice

Substance	Chemical present
Milk of Magnesia	Magnesium hydroxide
	Sodium hydrogencarbonate
	Citric acid

[2]

- (b) Hazard symbols are used to warn of danger. The hazard symbol below is found on a bottle of hydrochloric acid.



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- (i) Write down the name of this hazard symbol.

\_\_\_\_\_ [1]

- (ii) Put a circle round the correct pH for hydrochloric acid.

2

7

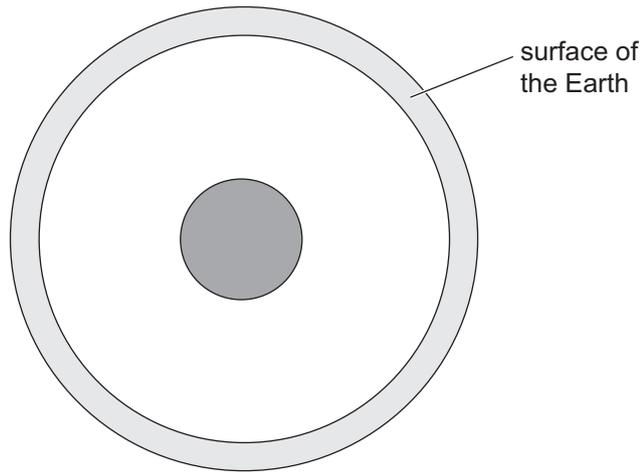
12

[1]

- (c) Write down the name of a plant that can be used to make a chemical indicator.

\_\_\_\_\_ [1]

2 The diagram below shows the structure of the Earth.



(a) Fill in the missing words in the sentences below.

Choose from:

**core      layer      mantle      crust      nucleus**

The surface of the Earth is called the \_\_\_\_\_.

It is made up of tectonic plates that float on the \_\_\_\_\_.

At the centre of the Earth is the \_\_\_\_\_. [3]

(b) Fill in the missing words in the table below about different rock types.

Rock type	Example
metamorphic	marble
sedimentary	
	granite

[2]

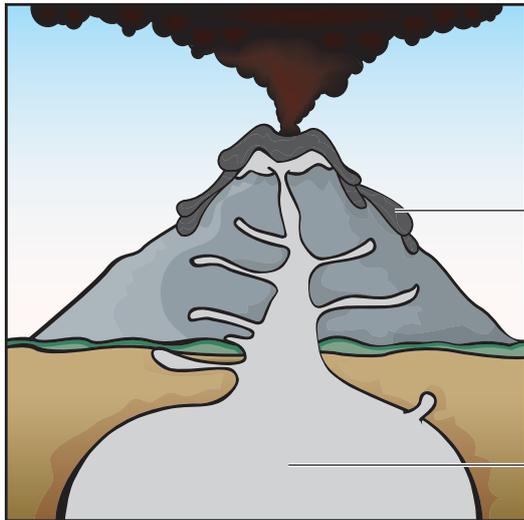
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Marks

Remark

(c) The diagram below shows a cross-section through an active volcano.

Label the parts of the volcano shown below.



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[2]

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Marks	Remark

3 (a) The table below shows the pH that some plants grow best in.

Plant	pH
apple	5.0–6.5
potato	4.5–6.0
blackcurrant	5.5–8.0
mint	7.0–8.0
onion	6.0–7.0
strawberry	5.0–7.0
lettuce	6.0–7.0

Use the information in the table and your knowledge to answer the questions below.

(i) Write down the name of the plant that will grow best in the most acidic soil.

\_\_\_\_\_ [1]

(ii) Write down the name of the plant that grows best over the largest **range** of pH values.

\_\_\_\_\_ [1]

(iii) The pH of a farmer's field is 6.5. How many plants named in the table would grow well at this pH?

\_\_\_\_\_ [1]

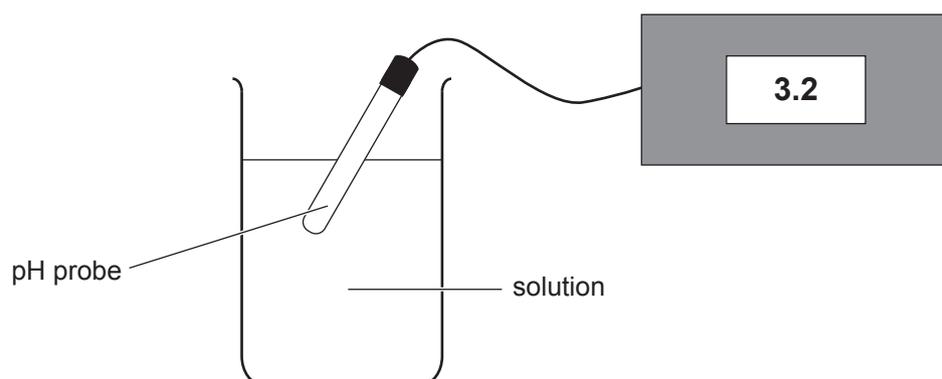
(b) Write down the name of a substance farmers can use to neutralise acidic soil.

\_\_\_\_\_ [1]

Examiner Only

Marks Remark

The diagram below shows a way of measuring pH.

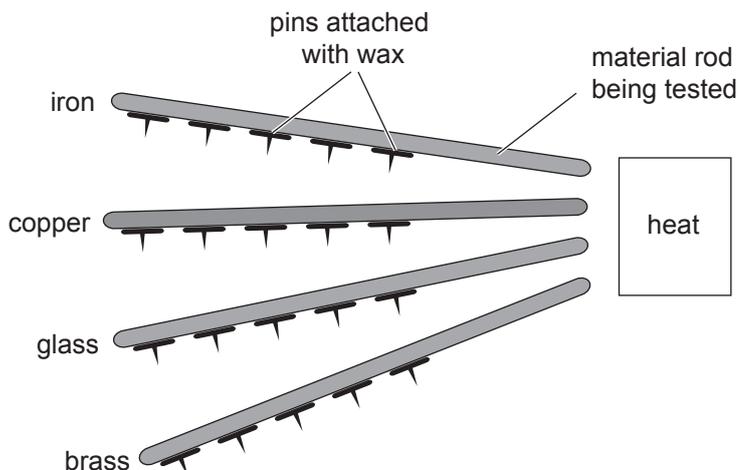


(c) Write down **one** advantage of using a pH probe instead of an indicator solution to measure pH.

\_\_\_\_\_ [1]

Examiner Only	
Marks	Remark

- 4 (a) A student investigated how four materials (iron, copper, glass and brass) allow heat to pass through them. He used the apparatus shown in the diagram below.



The number of pins still attached to each rod was recorded after 1, 3 and 5 minutes. The results are shown in the table below.

Material	Number of pins attached after;		
	1 minute	3 minutes	5 minutes
Iron	5	5	4
Copper	4	3	2
Glass	5	5	5
Brass	5	4	3

- (i) Put a circle around the pin that will fall off first. Do this on the diagram above.

[1]

- (ii) Write down the names of the four materials in order of conductivity.

\_\_\_\_\_ Best conductor  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_ Worst conductor

[2]

- (b) Write down **two** ways in which the student made this investigation a fair test.

1. \_\_\_\_\_

2. \_\_\_\_\_ [2]

Examiner Only	
Marks	Remark

- 5 Criminals can be identified by matching their fingerprint patterns with those taken from a crime scene.



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- (a) Arch, loop and whorl are three of the main fingerprint patterns. Write down the name of **one** other main fingerprint pattern.

\_\_\_\_\_ [1]

- (b) Police dust powder over prints so that they can see them. Write down the name of a powder used to show prints on a white surface.

\_\_\_\_\_ [1]

- (c) A national database could have everyone's fingerprint records.

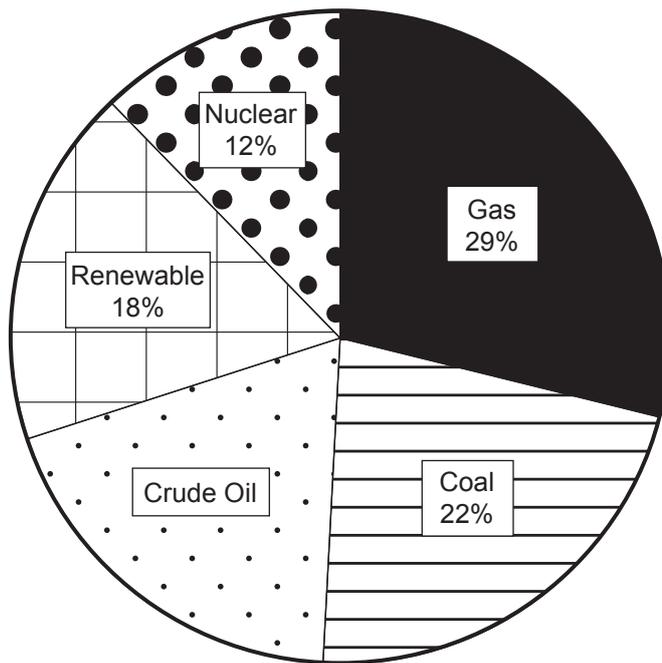
Why do you think a national database of fingerprints is useful and why do you think some people won't want a national database?

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_ [2]

Examiner Only

Marks Remark

- 6 Below is a pie chart showing sources of energy used in the UK during 2013.



- (a) Calculate the percentage of the UK's energy that came from crude oil in 2013.

(Show your working out.)

\_\_\_\_\_ % [2]

- (b) Fill in the missing answers in the paragraph below.

Crude oil is a mixture that can be separated by fractional distillation.

This involves heating the mixture to evaporate the different fractions.

This works because each fraction has a different \_\_\_\_\_

\_\_\_\_\_.

[1]

Examiner Only	
Marks	Remark

- 7 The Government has set local councils targets for recycling. The aim is to reduce the amount of waste that ends up in landfill sites.



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- (a) Some waste is non-biodegradable. Explain fully what is meant by the word 'non-biodegradable'.

\_\_\_\_\_ [2]

- (b) There are different methods of disposing of waste plastic. These are:

- **Burning** – waste plastic is burned to provide energy, but this can produce toxic gases such as carbon monoxide.
- **Landfill** – waste plastic can be put into landfill sites and left underground for many years. This can cause pollution of groundwater.
- **Recycling** – waste plastics can be recycled by melting and remoulding them into new items.

Which one of the methods above is the most environmentally friendly way to dispose of waste plastic? Explain fully your answer.

Method \_\_\_\_\_ [1]

Explanation \_\_\_\_\_

\_\_\_\_\_  
 \_\_\_\_\_ [2]

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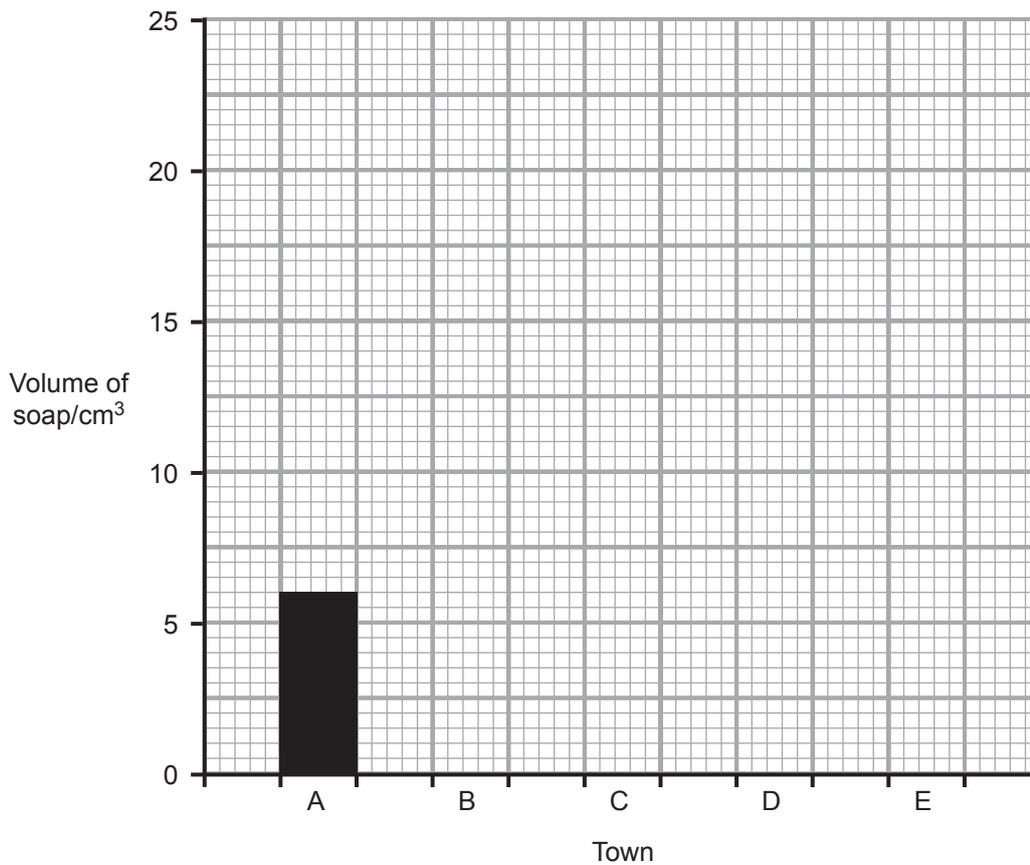


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**(Questions continue overleaf)**

- 9 (a) A scientist collected water samples from five towns (A, B, C, D and E). The table below gives the volume of soap solution needed to produce a lather with each of the samples.

Town	Volume of water/ $\text{cm}^3$	Volume of soap/ $\text{cm}^3$
A	50	6
B	50	17
C	50	24
D	50	20
E	50	11

- (i) Use the information in the table to complete the bar chart below.



[2]

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- (ii) Which town (**A, B, C, D** or **E**) has the hardest water?  
Explain your answer.

Town \_\_\_\_\_

Explanation \_\_\_\_\_

\_\_\_\_\_ [2]

- (iii) Scientists found that they needed  $11 \text{ cm}^3$  of soap to produce a lather after shaking the water sample from **town E**.  
Describe how they could continue their investigation to prove that the water is temporary hard water. Make sure you include how the results should show this.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_ [3]

- (b) (i) Write down the name of **two** metal ions that cause hard water.

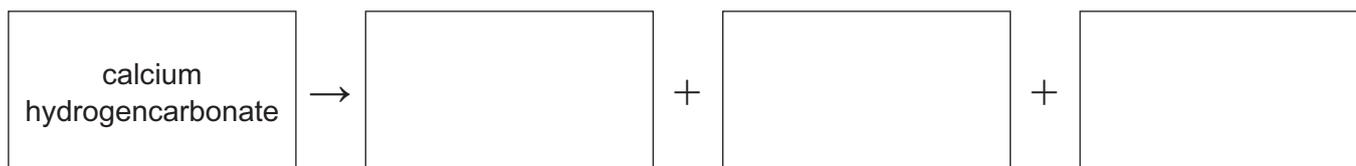
\_\_\_\_\_ and \_\_\_\_\_ [2]

- (ii) Hard water has a better taste. Write down **one** other advantage of drinking hard water.

\_\_\_\_\_ [1]

- (c) Hard water can cause undesirable deposits (fur) in kettles.

- (i) Complete the word equation to show how these undesirable deposits form in kettles.



[3]

- (ii) Write down **one** reason why these deposits cause problems in kettles.

\_\_\_\_\_ [1]

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Marks	Remark

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